

DrägerService

Installation site: \_\_\_\_\_

Explanation of symbols

— OK	C = Check condition
Defect/error/fault	O = Check function
○ Spare parts used	L = Check for leakage
/ Report	V = Enter test value
⌒ Accessories missing	

Serial no.: \_\_\_\_\_

Date of delivery/  
startup: \_\_\_\_\_

Invoice no. or  
delivery no.: \_\_\_\_\_

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Other: \_\_\_\_\_

Enter software version, see test item 3.1.

V

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1. Information about accompanying documents

1.1 Instructions for Use (depending on software version)

SW 10.n:

GA 6141.223

- German 90 28 261
- British English 90 28 262
- French 90 28 321
- Spanish 90 28 322

SW 11.n:

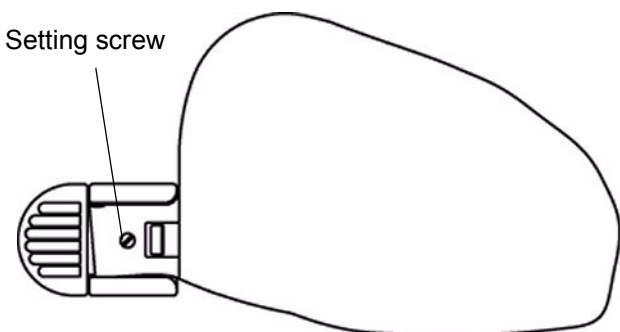
GA 6141.223

- German 90 28 478
- British English 90 28 479
- French 90 28 480
- Spanish 90 28 481
- American English 90 28 365
- Italian 90 28 433

1.2 Equipment manual

1.3 Operating instructions for special accessories. Operating instructions must be available in appropriate combination in line with entry in equipment manual.

2.	General condition		
2.1	Trolley	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.1.1	Castors 2 castors 2M 21048 and 2 lockable castors 2M 21050	O L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.1.2	Protective caps (orange)	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.1.3	Height adjustment with pedal	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.1.4	Check all visible screwed connections between bottom plate, trolley, pedestal and basic housing		
2.2	Cabinet left, right (if applicable)	C O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3	Incubator backpanel		
2.3.1	Flap for fresh air filter		
2.3.1.1	Sealing downstream the fresh air filter	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.1.2 *	Replace fresh air filter 84 02 926	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.2	Sticker 2M 20056 "dest. water"	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.3	Connection socket air temperature sensor	C O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.4	Connection socket for skin temperature sensor (only permissible for SW 10.n on the backpanel)	C O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.5	9-pole female connector RS232 (if applicable)	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.6	Mains connection	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.3.7	Water container with cover, magnetic holder and silicone hose	C O L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.4	Handles at the front of the incubator (if applicable)	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.5	Connection socket for oxygen supply	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.5.1	Sticker 2M 20519 "When supplying additional oxygen use an oxygen analyser + flow table"	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
2.6	Incubator canopy	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

2.6.1	Air temperature sensor with holder and connecting cable	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.2	Swivel window with seals  Adjust swivel window such that pane makes contact with seal. Check engagement and holding; to do so shut swivel window by exerting slight pressure such that retainer engages precisely. Then pull with fingers on outer edge of swivel window and move swivel window up and down:  Swivel windows must not open.  If necessary, reduce the force applied to the rubber cone with the setting screw (if available) or by shortening the rubber cone.	C O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.3	Adjust the swivel window using the setting screw    Slowly turn the setting screw of the retainer clockwise until the previously closed swivel window opens. Then turn setting screw 2 full turns counter-clockwise.	C O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.4	Hose feedthrough	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.5	Front flap, split or unsplit, with catches 2M 19899, short double wall with film hinge 2M 19729 (3 each) and locking pin 2M 21059 (2 each), front door hinges 2M 20730 (2 each)	C O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.5.1	Spring catches of front flap  Check function of the reset spring.	C O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.5.2 *	Replace spring 84 00496 of spring catches every 6 years.  Next replacement due: _____	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.6.5.3	Hinge frame 2M 19542 (Note: When disassembling the hinge frames turn Allen screw clockwise)	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										

2.6.5.4 Tappet, 2x  
Function of reset spring with unsplit front flap or retaining function with split front flap.

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2.6.6 Removable double wall (option)

Only permissible for resting surface with lateral tray.

2.6.7 Canopy holder

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Afterwards remove front flap and canopy.  
Note: Remove the connector from the air temperature and the skin temperature sensor first.

2.7 Bed with mattress

Check that openings for supports in the resting surface are not damaged.

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Important for removable double wall option: If no removable double wall is fitted to the canopy back, a bed extension 2M 21225 must be available (to be plugged onto the rear side of the resting surface and covering the gap between the resting surface and rear canopy wall).

Hose holder (if available)

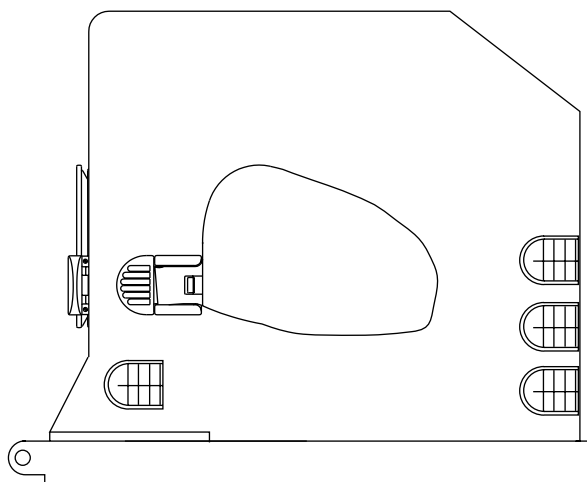
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Note:

Applies to bed 2M 20888 only:

Do not use a bed extension if the incubator has a canopy with curved rear panel and if the rear double wall is fitted, otherwise there is a risk of temperature loss.



2.7.1 Bed height adjustment

The bed can be pulled out at any height and any inclined position. Exert hand force on bed in pulled-out condition.

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- 2.7.2 2 supports 2M 21244 each with O-ring  
R 18074 for noise dampening when  
lowering the resting surface

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Then remove bed and supports.

- 2.7.3 Labels

The "Warning" labels "1" shown below on  
the front and rear of the bed area are  
present and not damaged (Note: If the bed  
edge is too narrow the label should be  
affixed on the outside on the rear of the  
cover).

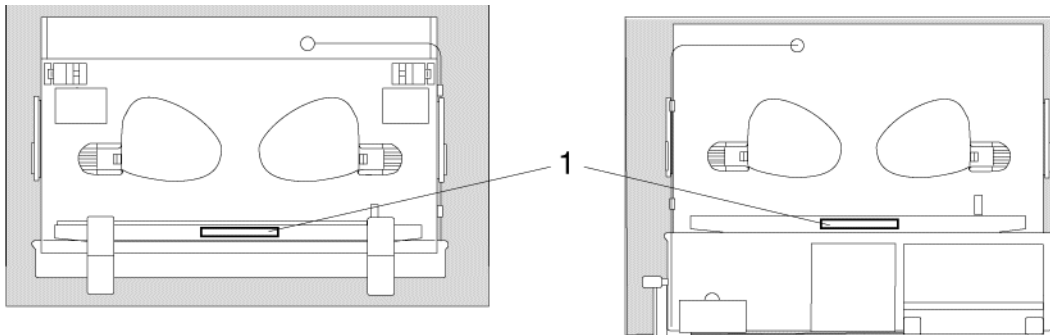


Fig.: Front (left) and rear (right) of bed  
area

**WARNING !**

Never block or obstruct air vents in the incubator baselement.  
Do not place surgical drapes or blankets over the air vents and the infant.  
Keep infants and their extremities clear of the warm air curtain.  
Danger of serious burns to the infant!

C



Part numbers of labels:

2M22228	German, Dutch
2M22229	English, French
2M22230	Italian, Greek
2M22231	Spanish, Portuguese
2M22232	Swedish, Finnish
2M22233	Norwegian, Danish
2M22234	Russian, Japanese

Note: Each part number includes two  
labels in each specified language, e.g.  
2M22228 contains two labels in German  
and two in Dutch.

2.8 Guides 2M 21240 for supports in the basic housing. On top of each guide there is a (white) guide plug 2M 21232

The bottom guide plug is checked in test item 5.4.

2.9 Intermediate element 2M 19537 (cover surface) with bed height adjustment 2M 21205

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When lowering the resting surface from the top position, the resting surface should move down smoothly.

2.10 Impeller compl. 2M 20205 with metal cone and O-ring M 19241 (large) and O-ring R 22364 (small) or silicone cone 2M 20542

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2.11 Trough 2M 19334 with 2x seal 2M 19595 for the supports

C

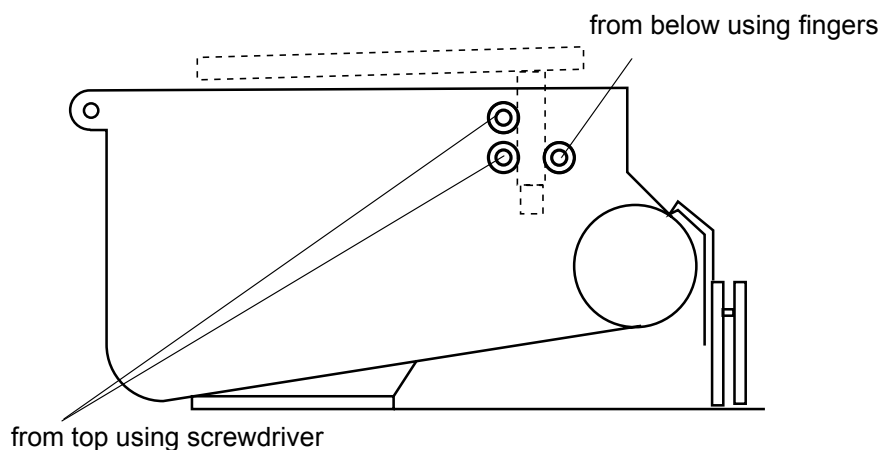
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Then remove impeller and trough.

2.12 Testing ball bearing of height adjustment supports

Open flap underneath electronics assembly.

Check 2 x 3 ball bearing set for easy movement as shown in the Figure below.



If the ball bearing set does not move easily, replace the whole set 1330128 (3).

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2.13 Aggregate seal 2M 19637

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2.14 Seal 2M 19638 between motor and trough

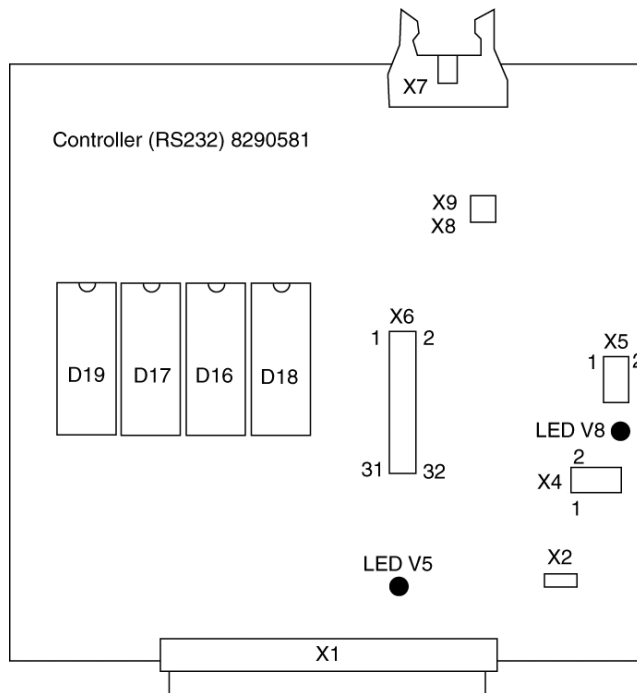
C

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2.15	Seal 2M 20023 between heating and trough	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.16	Motor												
2.16.1	Lubricate motor with oil 2M 07839  To do this remove screw next to motor shaft and pour 10 drops of oil into the threaded bore.	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.16.2	Check axial play  Test value: approx. 0.2 mm.	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.17	Condition of boiler  Disassemble boiler or unit (pilot lot).  Test to be performed every year.  Note: Disconnect power cord before and allow boiler to cool down! If necessary, scrape out interior of boiler.	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.17.1	Evaporator cap Cap 2M 20292 with O-ring 2M 08777  When assembling the boiler, lubricate O-ring of cap with lubricant, e.g. soapy water.	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.18	Additional fan  The fan is located below the trough.	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.19	Valve in the fresh air intake at the bottom side of the incubator housing	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
2.20	Fan failure test  To do so, mount trough and canopy without impeller and switch incubator on.  Following 30 s self-test (dashes only on actual value displays of all modules) fan failure alarm is given by means of a continuous tone and visually by the corresponding “fan failure” alarm LED in the air temperature module lighting up, heating LED off. The audible alarm cannot be suppressed by pressing the button “horn off”.  Switch unit off and assemble it ready for operation.	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										

To do so, fold down flap below the electronics module after undoing the two locks. The Controller PCB (viewed from the mounting side) is located at the top left of the electronics module. A yellow (V8) and a red (V5) LED are located on this PCB.

Controller PCB:



Function test:

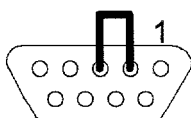
Switch incubator on.

Red and yellow LED light up continuously during incubator self-test (only dashes on the displays).

Incubator self-test completed.

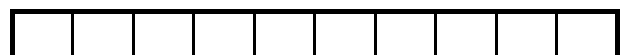
Red LED lights up, yellow LED off.

Produce a short-circuit at the connecting socket for the interface on the device backpanel between Pin 2 and 3 (loop test):









Red LED lights up, yellow LED flashes at a frequency of 1 Hz.

○



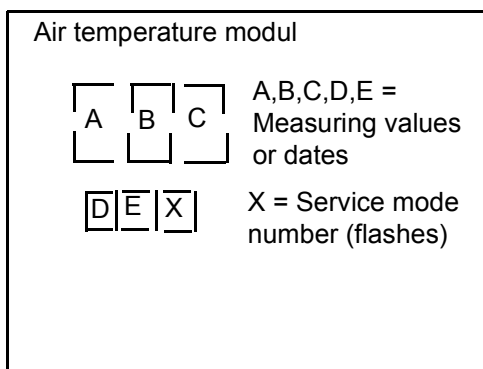


2.22	Power Pack PCB		
	<p>From approx. 1993 a miniature fan will be installed on this PCB at the bottom right in the electronics module, which should operate when the unit is switched on.</p> <p>Important: This fan is only required if the option RS 232 (Controller PCB) is available. In case this option is not available, you may disconnect this fan if the noise emission gets too high.</p> <p>Then switch off unit and assemble it in operational condition, do not close the flap below the module.</p>	O	
2.23	Membrane keypad	C	
2.24	CPU PCB with SW 10.n		
	<p>If the unit is equipped with CPU PCB 8290571-00, replace the PCB with 8290571 greater than or equal to 01.0, see Service bulletin.</p>		
2.25	Seca balance (if applicable) with plug-in power pack 2M 20 640, battery 83 01 856 and label "do not pull out".	C	
2.25.1	Function test		
	<p>Line up balance until water level is vertical.</p> <p>Place the resting surface on the scales and press the "check" key.</p> <p>Indication of weight shows "test". Then LEDs and all segments of the indication of weight (8888) are switched on and off several times. Then a test value is indicated which must be between 8990 and 9010. The end is indicated by text "end".</p>	O	
2.26	Rack for additional equipment (Option)	C	
2.27	Connection socket for skin temperature sensor from SW 11.n (1 or 2) on left equipment side with sticker (pictograph)	C	

3. Record operating data, comparison of measured values of temperature sensors and severe 10 minute test

To do so, switch unit on, wait for 35 s self-test to be completed and press buttons “horn off” and “air temperature” simultaneously for 8 s:

The service mode number will flash on the lower right display of the air temperature module.



The next mode each can be reached by pressing the button “+air temperature”. The service mode can be exited any time by pressing the key “check lights”.

- |     |  |   |   |  |  |  |  |  |  |  |  |  |  |
|-----|--|---|---|--|--|--|--|--|--|--|--|--|--|
| 3.1 | <p>Mode 0</p> <p>Software-version AB.CD</p>  | V | <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  |
|     |  |   |   |  |  |  |  |  |  |  |  |  |  |
| 3.2 | <p>Mode 1</p> <p>Operating hours A B C D E in hours.</p>   | V | <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  |
|     |  |   |   |  |  |  |  |  |  |  |  |  |  |
| 3.3 | <p>Mode 2</p> <p>Actuating operations of button “check lamps”.</p> <p>A B C D E = number of actuating operations</p>   | V | <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  |
|     |  |   |   |  |  |  |  |  |  |  |  |  |  |
| 3.4 | <p>Mode 3</p> <p>Actuating operations of button “check 36.0 °C” (only if skin temperature module is available)</p> <p>A B C D E = no. of actuating operations</p> <p>Mode 4:</p> <p>not applicable for Incubator 8000 SC/NC.</p> | V | <table border="1" style="width: 100%; height: 20px; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td><td style="width: 10%;"></td> </tr> </table> |  |  |  |  |  |  |  |  |  |  |
|     |  |   |   |  |  |  |  |  |  |  |  |  |  |

3.5	<p>Mode 5</p> <p>Measured value of overtemperature sensor in °C.</p> <p>The max. deviation from the measured value of the air temperature sensor (mode 6) may be 0.3 °C.</p>	V	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
3.6	<p>Mode 6</p> <p>Measured value of the air temperature sensor in °C.</p> <p>Mode 7, 8 and 9: not applicable for Incubator 8000 SC/NC.</p>	V	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
3.7	<p>Mode A</p> <p>A/D test channel in mV (as of SW 10.04) ABCD: 4400 ±300</p> <p>Calibration: see repair instruction Analog PCB.</p>	V	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
3.8	<p>Mode B</p> <p>Measured value skin temperature sensor 1 (core temperature, top socket), as of SW 11.n.</p>	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
3.9	<p>Mode C</p> <p>Measured value skin temperature sensor 2 (peripheral temperature, bottom socket), as of SW 11.n.</p>	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
3.10	<p>Severe 10 minute test</p> <p>To do so, press button “reset overtemperature” in service mode 10 times every 2 seconds.</p> <p>No „INOP“ error message.</p>	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										

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4. Replacement of wear and tear parts electronics

To do so, fold down the flap below the electronics module after undoing the two locks.

4.1 \* Replace battery 83 01 856 on the Power Pack PCB every year

Note: Do not close flap.

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5. Technical safety check

To do so, fold down flap below electronics module after undoing the two locks.

5.1 Protective conductor test

Test items:

Protective conductor terminal at the left side of the unit, trolley, screws at the height-adjustable pedestal, flap below electronics module, metal housing electronics module.

Test value:  $R < 0.2 \text{ Ohm}$ .

O

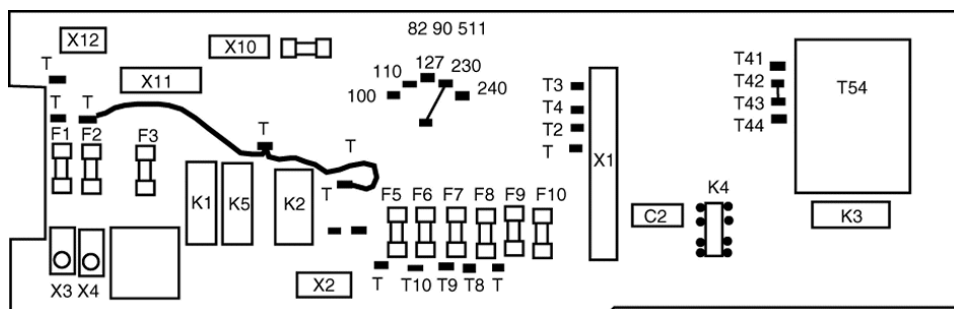
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5.2 Equivalent device leakage current measurement

**Caution: Detach mains connection before!**

For measurement purposes the switch-on relay and the safety relay must be jumpered.

Unit PCB 82 90 511:



Subsequent measurements may exceed the first measured value of the test certificate by 50% max. but must not exceed the specified test value.

Test value:  $I_A$  lower 1.0 mA

V

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Note: The first measured value must be recorded in the new test certificate.

First measured value:  $I_A =$     mA

With Gerb Eutotester GM-50

Switch positions on Gerb Eurotester:

Application part: all

IEC/VDE standard: VDE 751

Protection class: 1

Test item: Equivalent device leakage current SL

Insert power plug of Incubator 8000 NC into test receptacle of the Gerb Eurotester.

Important:

The measured values indicated on the Gerb Eurotester are approx. 10 % lower than the measured values indicated on the Wison VDE tester.

Make sure Incubator 8000 NC is switched on.

Subsequent measurements may exceed the first measured value of the Test Certificate by 50% max. but must not exceed the specified test value.

Test value:

Equivalent device leakage current:  
lower than 1.0 mA

V

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Note:

The first measured value must be recorded in the new Test Certificate.

Important: After measurement was performed the connections of the solder tags must be removed.

5.3

Visual check of the mains power conducting cables

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5.4

Bed height adjustment

Mounting of the guides 2M 21240 for the supports of the resting surface height adjustment. At the bottom of each guide there is a (white) guide plug 2M 21243.

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Close flap below electronics module and assemble incubator ready for operation.

## 5.5 Testing the CPU PCB

The 8290571-00 CPU is not permitted for use, see Service bulletin.

The following CPUs are permitted:  
8290571 greater than 01 and 8305141.

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## 6. Function check

The function check must be carried out at room temperature (20 – 28 °C). There must be no additional objects in the patient compartment.

### 6.1 Not applicable

### 6.2 Incubator basic functions

Switch incubator on.

Green operating LED lights up. Dashes are indicated on the actual value display of all modules for 35 s. Any overtemperature alarm can be deactivated by pressing the „reset overtemperature“ button.

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#### 6.2.1 Press button “Check lights”

All LEDs except for the power failure LED light up; all digital displays indicate 88.8 and a continuous tone sounds. LEDs and displays are then blanked for 1 second and the horn is deactivated.

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Note: “Alarm” LED must only be available in SW 11.nn and is also only controlled by this Software.

### 6.3 Air temperature module

The desired value of 33.0 °C flashes. “SEt” and the current air temperature flash alternately in the actual value display. Acknowledge desired value by pressing “+air temperature” or “-air temperature”.

Continuous display of desired value and actual value (except for alarms in the air temperature module).

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#### 6.3.1 Checking the desired value setting and “>37 °C” function

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#### 6.3.2 Set desired value to 36,0 °C

Reference measurement in the centre of the bed at a height of 10 cm using

thermometer 2M 11111.

Test value:  $36.0 \pm 1.0$  °C.

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For adjustment instructions, see repair instructions.

Note: Check the humidity module during the warm-up phase => [6.4](#).

6.3.3

Set desired value by 1.6 °C lower or higher than the actual value

Actual value display, “+1.5 °C” LED and “Alarm” LED flash and intermittent audible alarm. Press “horn off” button.

Horn off, actual value display flashes, “+1.5 °C”, “Alarm” and “Horn off” LEDs light up.

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6.3.4

Additional fan

Set desired value by 1.0 °C higher than actual value.

Heating LED flashes, additional fan stops.

Set desired value by 1.0 °C lower than actual value.

Heating LED off, additional fan works, no abnormal noise.

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Note: A time delay may occur due to the PID controller.

6.3.5

Heating fan

No abnormal noise of fan motor and impeller.

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Then set desired value to 37.0 °C.

6.3.6

Swivel out air temperature sensor and remove it from the retainer

Visual and audible sensor alarm, heating off.

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6.3.7

Pull plug for air temperature sensor

Visual and audible sensor alarm, heating off.

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Then connect air temperature sensor ready for operation.

6.4	<p>External oxygen supply</p> <p>To do so, supply oxygen to the incubator via O2 socket.</p> <p>If the rating plate indicates 50 Hz or 50/60 Hz:</p> <p>7.5 +0.5 L/min O2 at 50 Hz</p> <p>9.0 +0.5 L/min O2 at 60 Hz</p> <p>If rating plate indicates 60 Hz:</p> <p>7.5 +0.5 L/min.</p> <p>Comparison measurement using an Oxydig after 30 minutes.</p> <p>Test value: 40 +4/-6% by vol. O2.</p> <p>If the test value is not reached, the incubator will be leaky or the fresh air intake will be faulty.</p>	<div><div></div></div>	<div><div></div></div>
6.5	<p>Humidity module</p> <p>Checking of desired value adjustment by means of buttons “+desired value” or “-desired value” humidity from 0 (switched off) to 10 (max. humidity supply).</p>	<div><div></div></div>	<div><div></div></div>
6.5.1	<p>Set desired value to 6.</p> <p>After 30 minutes, no humidity condensation in the canopy apart from the corners.</p>	<div><div></div></div>	<div><div></div></div>
6.5.2	<p>Water shortage alarm</p> <p>To do so, interrupt water supply and set desired value to 9:</p> <p>After a few minutes (depending on the start temperature of evaporator up to 25 minutes) visual and audible water shortage alarms will be given.</p> <p>Suppress the audible alarm by pressing the “horn off” button.</p>	<div><div></div></div>	<div><div></div></div>
6.5.2.1	<p>Establish water supply</p> <p>H2O alarm LED goes off after 6 minutes max.</p>	<div><div></div></div>	<div><div></div></div>
6.5.3	<p>At a desired value of 9 water will condense at the top of the canopy</p>	<div><div></div></div>	<div><div></div></div>



6.6 Skin temperature module (Option)

6.6.1 Connect skin temperature sensor to top socket (for SW 11.n and if 2 sockets are available) and leave bottom socket open.

The sensor temperature will be displayed. If the temperature measured is outside the measuring range, the following messages will be displayed on the actual value display:

above measuring range: „---“

below measuring range: „---“

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6.6.2 Thermomonitoring (Option)

Connect sensor to bottom socket and press “foot symbol” button.

The LED in the button comes on, the temperature is displayed as described under 6.6.1.

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Connect sensor to top socket.

6.6.3 Press “Check 36 °C” button

Display of actual skin temperature value =  $36.0 \pm 0.1$  °C.

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**NOTE:** The following test applies only to units with skin temperature sensor connections on the left hand side of the unit.

Plug the 36 °C test connector (7911314) into the yellow and white socket of the skin temperature sensors.

The displayed actual core temperature may deviate by a maximum of  $\pm 0.2$  °C from the simulated value (36 °C).

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Wiggle the connected yellow 36 °C test connector horizontally and vertically.

The displayed actual core temperature may deviate by a maximum of  $\pm 0.2$  °C from the simulated value (36 °C).

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On incubators with the “Thermomonitoring” option press and hold down the button “foot symbol”.

The displayed actual peripheral temperature may deviate by a maximum of  $\pm 0.2$  °C from the simulated value (36 °C).

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Wiggle the connected white 36 °C test

connector horizontally and vertically.

The displayed actual peripheral temperature may deviate by a maximum of  $\pm 0.2\text{ }^{\circ}\text{C}$  from the simulated value ( $36\text{ }^{\circ}\text{C}$ ) as you wiggle the connector.

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All other measurements up to test item 6.6.6 to be carried out with the skin temperature sensor in a water bath at a temperature of  $33$  to  $38\text{ }^{\circ}\text{C}$ .

- 6.6.4 Comparison measurement between skin temperature sensor and thermometer 2M 11111, not with single-use sensor.

Test value: allowed deviation  $0.4\text{ }^{\circ}\text{C}$ .  
Check the sensor for cable break.

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- 6.6.5 Switch on skin temperature module with button "Control" in the skin temperature module

Green LED "Control" lights up. The current skin temperature actual value is taken over as desired value and flashes:

Exception:

a) actual value  $< 35.0\text{ }^{\circ}\text{C}$   $\Rightarrow$  desired value  $= 35.0\text{ }^{\circ}\text{C}$

b) actual value  $< 37.0\text{ }^{\circ}\text{C}$   $\Rightarrow$  desired value  $= 37.0\text{ }^{\circ}\text{C}$

The current actual skin temperature value and "SEt" flash alternately, or – in case of alarms in the module – only the actual value flashes. Acknowledge desired value by pressing the "+desired value" button or "-desired value" skin temperature button.

Continuous display of desired value and actual value of skin temperature (except for alarms in the skin temperature module).

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- 6.6.6 Checking the desired value adjustment with the "+desired value" and "-desired value" buttons skin temperature within the limits of  $35.0\text{ }^{\circ}\text{C}$  and  $37.0\text{ }^{\circ}\text{C}$ .

Should the actual value deviate by more than  $0.5\text{ }^{\circ}\text{C}$  from the desired value a visual and audible alarm will be given.

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- 6.6.7 Pull plug of skin temperature sensor

For SW 10.nn

Visual and audible sensor alarm, heating off.

For SW 11.nn

	Visual and audible sensor alarm after approx. 15 s, heating off.	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
	Then press “Control” button in the air temperature module and set desired air temperature value to 39.0 °C.												
	Green “Control” LED in the air temperature module lights up.												
6.7	Power failure alarm												
	Set desired air temperature value to 39.0 °C, desired humidity value to 6 and disconnect unit from mains.												
	Continuous visual and audible alarm for 30 seconds.												
	Establish mains connection.												
	The desired values have not changed.	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
6.8	Clear error list	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
<hr/>													
7.	Test of accessories and special accessories required for operation												
7.1	CS-O2 connecting hose blue marking non-reusable hose clamps	C L	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
7.2	O2 flowmeter 2M 19510	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
7.2.1	Rail claw	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
7.2.2	Thread M 12 x 1 (female)	C	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
7.2.3	Plastic sleeve M 23946	C L	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
	Plastic sleeve M 23946. To be replaced in case of fissuring.												
	Ring D 11137. To be replaced, if necessary.												
7.2.4	Control valve M 18376	O L	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										
	Soap bubble test.												
	Stop with control valve fully open.												
7.2.5	Output At 5 bar supply pressure and with control valve fully open.												
	Test value: V > 40 L/min.	O	<table><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										

7.2.6	Flowmeter comparison measurement		
	Check with 3 values.		
	At lowest measurement point +15%, at all other measurement points +10% of reference value.	O	<input type="text"/>
7.2.7	Cap nut M 04235 M 34 x 1.5 (female)	C	<input type="text"/>
7.2.7.1	Seal M 04237	C	<input type="text"/>
7.2.8	Connecting socket M 06258	C	<input type="text"/>
7.2.9	Connecting hose 0.5 m	C	<input type="text"/>
7.3	O2 limiter 2M 16010	C	<input type="text"/>
7.3.1	Sticker 2M 16459	C	<input type="text"/>
7.3.2	Leak test		
	Pressure built up: p = 100 mbar.		
	Test value: After 1 minute no pressure drop (short hose to pressure gauge).	L	<input type="text"/>
7.3.3	Setting		
	5 bar supply pressure and the control valve fully open.		
	Test value:		
	„white field“ V = 5.5 - 6.0 L/min		
	„red field“ V > 16 L/min.	O	<input type="text"/>
7.4	Oxygen measurement device		
	Test according to Test Certificate „Oxydig“ or „MiniOX 3000“.	C O	<input type="text"/>
7.4.1	Measuring instrument holder 2M 17770	C	<input type="text"/>
7.5	Vacuum mattress 2M 16920	C O	<input type="text"/>
7.6	Infusion stand	C O	<input type="text"/>
7.7	Ventilation hose holder 2M 19630	C O	<input type="text"/>
7.8	Tray (20*30 cm) M 24678	C O	<input type="text"/>
7.9	Oxygen distributor 2M 19555	C O L	<input type="text"/>
7.10	Aspiration		

7.11	*	Replace bacteria filter CH 102 (set of 5: 6723976)	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.1		Frame M 25858	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.1.1		Jar holder	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.1.2		Connecting hose	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.1.3		Secretion aspiration hose M 25780	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.1.4		Secretion sight glass or finger tip	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.2		Jar M 20091 (2 x)	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.3		Jar cap 2M 85011	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.3.1		Check tightness of collar M 26008 and angled socket 2M 19063	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.4		Float M 26007	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.5		Function		
		Assemble complete aspiration system.		
		Build up vacuum and turn jar around: float is drawn in.		
		Turn jar around and shut off vacuum: float drops back.	O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.6		Relief valve (if fitted) with mica insulator R 17329	C O L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.7		Ejector		
7.11.7.1		Output with paediatric bronchial aspiration 2M 85125 (-0.5 bar)		
		Output -0.5 bar, of which -0.4 bar in 10 s.	O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.7.2		Output with bronchial aspiration 2M 85120 (-0.9 bar)		
		Output -0.8 bar, of which -0.7 bar in 10 s.	C O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.8		Vacuum gauge		
		Reference measurement.		
		Perm. tolerance $\pm 4\%$ of full scale value.	C O	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.9		Shutoff valve		
7.11.10		Control valve	C	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
7.11.11		CS connecting hose in line with national regulations	C L	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

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8. Make unit available to the user in a ready-to-operate condition

8.1 All unit covers and components must have been fixed in position

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8.2 There must be no dirt or tackiness noticeable on the unit which could impair safety

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8.3 Check unit labelling

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8.4 The incubator must be standing firmly and steadily

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8.5 Visually inspect unit assembly for perfect condition

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9. Test Certificate

Name:

Date:

Signature:


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10. \* These steps are regarded as repair work and therefore not included in the inspection service price.

11.

Report:

[illegible]

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12. Appendix

12.1 Test equipment

Flowmeter, 10 to 120 L/min	79 00 718
Flowmeter block, 0,2 to 14 L/min	79 01 161
Flowmeter O2, 16 L/min, 5 bar	2M 85 502
Oxydig, complete	83 04 411
or	
MiniOx 3000	2M 22 464
or national equivalent oxygen measurement device	
Thermometer	2M 11 111
or	
Temperature- and humidity measurement device	79 10 980
Socket wrench set, 1/4"	79 00 905
Mains power tester Secutest	
or	79 10 594
or national equivalent mains power tester for 110/127 V voltage range	
Sensor simulator, skin temperature	79 01 236
Sensor simulator, Incubator 8000	79 01 240
Test connector 36 °C	79 11 314
Dummy assembly, Incubator 8000, complete with connecting cable	79 01 764
Measuring lead, red 0,25 m	79 00 679
Measuring lead, black 0,25 m	79 00 680
Measuring probe, red Kleps 30	79 01 026
Measuring probe, black Kleps 30	79 01 027
Touch-up applicator, blue munsell	79 01 261
Touch-up applicator, light orange munsell	79 01 262



## 12.2 Tools and supplies for repair

Teflon strip 12 x 0,1 1-PTFE/BAM-DVGW CS	11 92 507
Oil HLP 32, 10 mL bottle, DIN 51524	2M 07 839
Cabel ties 2,4 x 200	87 12 065

## 12.3 Spare parts

every maintenance	- ambient filter	84 02 926
yearly	- rechargeable battery (Accu) - bakterial filter (Option „Bronchus-Absaugung“)	83 01 856 67 23 976
every 2 years	- filter screw	2M 19 622
every 6 years	- spring of spring catches - pressure regulator (Option „O2 controlling“)	84 00 496 84 02 745